

Amendments to the Claims:

1. (Currently Amended) A method for preserving data in a data storage system, the method comprising:

receiving a command to preserve data in the data storage system;

executing, for a first data, a first input/output (I/O) process directed to a first storage volume, wherein the first I/O process begins at a first time which is prior to receiving the command;

creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command;

writing a second data directed to the first second storage volume as part of a second I/O process which begins after the first time; and

determining from the data structure whether data corresponding to the second data is stored in the second image and if it is, modifying the data structure to indicate that the second data is [[not]] stored in the second image and storing the second data in the first second image.

2. (Original) The method of claim 1, wherein the first storage volume is a first virtual logical unit (VLUN) and the second storage volume is a second VLUN.

3. (Cancelled)

4. (Currently Amended) The method of claim 1, further comprising:

acquiring a lock from a lock mechanism before modifying the data structure to indicate that the second data is [[not]] stored in the second image; and

releasing the lock after storing the second data in the first second image.

5. (Original) The method of claim 4, wherein the lock mechanism is maintained independent to the first and the second storage images.

6. (Original) The method of claim 1, further comprising:

receiving a third data being written to a data block of the second storage volume;

updating the data structure to indicate the data block is stored on the second storage image; and

writing the third data to the data block on the second image.

7. (Original) The method of claim 6, wherein the updating comprises: determining whether the data block is stored on the first storage image; and updating the data structure to indicate the data block is stored on the second storage image, if the data block is stored on the first image.

8. (Original) The method of claim 7, wherein the determining comprises: examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image; and creating the entry associated with the data block if the entry does not exist.

9. (Original) The method of claim 6, further comprising: acquiring a lock from a lock mechanism before the updating; and releasing the lock after the writing.

10. (Original) The method of claim 9, wherein the lock mechanism is maintained independent to the first and the second storage images.

11. (Currently Amended) The method of claim 1, further comprising: receiving a request to read from a data block on the second storage volume; determining whether the data block is stored in the first image or the second image, based the data structure associated [[with]] the second storage image; reading the data block from the first image if the data block is stored in the first image; and reading the data block from the second image if the data block is stored in the second image.

12. (Original) The method of claim 11, further comprising examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image.

13. (Original) The method of claim 11, further comprising: acquiring a lock from a lock mechanism before the determining; and releasing the lock after the reading.

14. (Original) The method of claim 13, wherein the lock mechanism is maintained independent to the first and the second storage images.

15. (Currently Amended) An article of manufacture comprising:
a machine-readable medium having executable code to cause a machine to perform
a method for preserving data in a data storage system, the method comprising:
receiving a command to preserve data in the data storage system;
executing, for a first data, a first input/output (I/O) process directed to a first storage
volume, wherein the first I/O process begins at a first time which is prior to receiving the
command;
creating a data structure, in response to the command, for at least a second image
which corresponds to a second storage volume, the second storage volume storing changes
to the first storage volume occurring after receipt of the command;
writing a second data directed to the first second storage volume as part of a second
I/O process which begins after the first time; and
~~determining from the data structure whether data corresponding to the second data is~~
~~stored in the second image and if it is, modifying the data structure to indicate that the~~
~~second data is [[not]] stored in the second image and storing the second data in the first~~
~~second image.~~

16. (Currently Amended) The article of manufacture machine-readable medium
of claim 15, wherein the first storage volume is a first virtual logical unit (VLUN) and the
second storage volume is a second VLUN.

17. (Cancelled)

18. (Currently Amended) The article of manufacture machine-readable medium
of claim 15, wherein the method further comprises:
acquiring a lock from a lock mechanism before modifying the data structure to
indicate that the second data is [[not]] stored in the second image; and
releasing the lock after storing the second data in the first second image.

19. (Currently Amended) The article of manufacture machine-readable medium
of claim 18, wherein the lock mechanism is maintained independent to the first and the
second storage images.

20. (Currently Amended) The article of manufacture machine-readable medium
of claim 15, wherein the method further comprises:
receiving a third data being written to a data block of the second storage volume;

updating the data structure to indicate the data block is stored on the second storage image; and
writing the third data to the data block on the second image.

21. (Currently Amended) The article of manufacture machine-readable-medium of claim 20, wherein the updating comprises:

determining whether the data block is stored on the first storage image; and
updating the data structure to indicate the data block is stored on the second storage image, if the data block is stored on the first image.

22. (Currently Amended) The article of manufacture machine-readable-medium of claim 21, wherein the determining comprises:

examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image; and
creating the entry associated with the data block if the entry does not exist.

23. (Currently Amended) The article of manufacture machine-readable-medium of claim 20, wherein the method further comprises:

acquiring a lock from a lock mechanism before the updating; and
releasing the lock after the writing.

24. (Currently Amended) The article of manufacture machine-readable-medium of claim 23, wherein the lock mechanism is maintained independent to the first and the second storage images.

25. (Currently Amended) The article of manufacture machine-readable-medium of claim 15, wherein the method further comprises:

receiving a request to read from a data block on the second storage volume;
determining whether the data block is stored in the first image or the second image, based the data structure associated [[with]] with the second storage image;
reading the data block from the first image if the data block is stored in the first image; and
reading the data block from the second image if the data block is stored in the second image.

26. (Currently Amended) The article of manufacture machine-readable-medium of claim 25, wherein the method further comprises examining a lookup table to determine

whether there is an entry associated with the data block, the lookup table being associated with the second storage image.

27. (Currently Amended) The article of manufacture machine-readable-medium of claim 25, wherein the method further comprises:

acquiring a lock from a lock mechanism before the determining; and
releasing the lock after the reading.

28. (Currently Amended) The article of manufacture machine-readable-medium of claim 27, wherein the lock mechanism is maintained independent to the first and the second storage images.

29. (Currently Amended) An apparatus for preserving data in a data storage system, comprising:

means for receiving a command to preserve data in the data storage system;
means for executing, for a first data, a first input/output (I/O) process directed to a first storage volume, wherein the first I/O process begins at a first time which is prior to receiving the command;
means for creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command;
means for writing a second data directed to the first second storage volume as part of a second I/O process which begins after the first time; and
means for determining from the data structure whether data corresponding to the second data is stored in the second image and if it is, modifying the data structure to indicate that the second data is [[not]] stored in the second image and storing the second data in the first second image.

30. (Original) The apparatus of claim 29, wherein the first storage volume is a first virtual logical unit (VLUN) and the second storage volume is a second VLUN.

31. (Cancelled)

32. (Currently Amended) The apparatus of claim 29, further comprising:
means for acquiring a lock from a lock mechanism before modifying the data structure to indicate that the second data is [[not]] stored in the second image; and
means for releasing the lock after storing the second data in the first second image.

33. (Original) The apparatus of claim 32, wherein the lock mechanism is maintained independent to the first and the second storage images.

34. (Currently Amended) The apparatus of claim 29, further comprising: ~~means~~ means for receiving a third data being written to a data block of the second storage volume;

means for updating the data structure to indicate the data block is stored on the second storage image; and

means for writing the third data to the data block on the second image.

35. (Original) The apparatus of claim 34, wherein the means for updating comprises:

means for determining whether the data block is stored on the first storage image; and

means for updating the data structure to indicate the data block is stored on the second storage image, if the data block is stored on the first image.

36. (Original) The apparatus of claim 35, wherein the means for determining comprises:

means for examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image; and

means for creating the entry associated with the data block if the entry does not exist.

37. (Original) The apparatus of claim 34, further comprising:

means for acquiring a lock from a lock mechanism before the updating; and

means for releasing the lock after the writing.

38. (Original) The apparatus of claim 37, wherein the lock mechanism is maintained independent to the first and the second storage images.

39. (Currently Amended) The apparatus of claim 29, further comprising:

means receiving a request to read from a data block on the second storage volume;

means determining whether the data block is stored in the first image or the second image, based the data structure associated ~~[[with]]~~ with the second storage image;

means reading the data block from the first image if the data block is stored in the first image; and

means reading the data block from the second image if the data block is stored in the second image.

40. (Original) The apparatus of claim 39, further comprising means for examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image.

41. (Original) The apparatus of claim 39, further comprising:

means for acquiring a lock from a lock mechanism before the determining; and
means for releasing the lock after the reading.

42. (Original) The apparatus of claim 41, wherein the lock mechanism is maintained independent to the first and the second storage images.

43. (Currently Amended) A data storage system, comprising:

a processing system; and

a memory coupled to the processing system, the memory storing instructions, which when executed by the processing system, cause the processing system to perform the operations of:

receiving a command to preserve data in the data storage system;

executing, for a first data, a first input/output (I/O) process directed to a first storage volume, wherein the first I/O process begins at a first time which is prior to receiving the command;

creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command;

writing a second data directed to the first second storage volume as part of a second I/O process which begins after the first time; and

determining from the data structure whether data corresponding to the second data is stored in the second image and if it is, modifying the data structure to indicate that the second data is [[not]] stored in the second image and storing the second data in the first second image.

44. (Original) The method of claim 1, wherein the second I/O process is capable of accessing the same data, via the second storage volume, as the first I/O process.

45. (Currently Amended) The article of manufacture machine-readable medium of claim 15, wherein the second I/O process is capable of accessing the same data, via the second storage volume, as the first I/O process.

46. (Original) The apparatus of claim 29, wherein the second I/O process is capable of accessing the same data, via the second storage volume, as the first I/O process.